

VALLEY GREEN (PWSNO 1280195) SOURCE WATER ASSESSMENT REPORT

September 4, 2001



State of Idaho Department of Environmental Quality

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Executive Summary

Under the Safe Drinking Water Act Amendments of 1996, all states are required by the U.S. Environmental Protection Agency to assess every source of public drinking water for its relative sensitivity to contaminants regulated by the act. This risk assessment is based on a land use inventory in the well recharge zone, sensitivity factors associated with how the well was constructed, and aquifer characteristics.

This report, *Source Water Assessment for Valley Green*, describes the public drinking water well; the well recharge zone and potential contaminant sites located inside the recharge zone boundaries. This assessment, taken into account with local knowledge and concerns, should be used as a planning tool to develop and implement appropriate protection measures for this public water system. **The results should not be used as an absolute measure of risk and they should not be used to undermine public confidence in the water system.**

Valley Green drinking water is supplied by a 390-foot deep well pumping from the Rathdrum Prairie Aquifer. The water system serves a population of about 180 people in a residential neighborhood on the west side of Hayden Lake, Idaho. The system is owned and operated by North Kootenai Water District. Historically, Valley Green has had few water quality problems. The system chlorinates its water to control bacterial contamination entering the system through the reservoir and distribution system. A ground water susceptibility analysis conducted by DEQ July 11, 2001 found the wells to be moderately susceptible to all classes of regulated contaminants, mostly because of natural factors associated with local geology.

This assessment should be used as a basis for determining appropriate new protection measures or re-evaluating existing protection efforts. No matter what ranking a source receives, protection is always important. Whether the source is currently located in a “pristine” area or an area with numerous industrial and/or agricultural land uses that require education and surveillance, the way to ensure good water quality in the future is to act now to protect valuable water supply resources.

Because 186 public water systems in Idaho draw water from the Rathdrum Prairie Aquifer, they should consider forming a regional group to represent their interests before state, county and municipal governing bodies when regulatory tools like zoning overlays, or enactment of building codes are the most appropriate ground water protection measures. Partnerships with state and local agencies and industry groups should also be established.

Due to the time involved with the movement of ground water, source water protection activities should be aimed at long-term management strategies even though these strategies may not yield results in the near term. For assistance in developing protection strategies, please contact your regional Department of Environmental Quality office or the Idaho Rural Water Association.

SOURCE WATER ASSESSMENT FOR VALLEY GREEN

Section 1. Introduction - Basis for Assessment

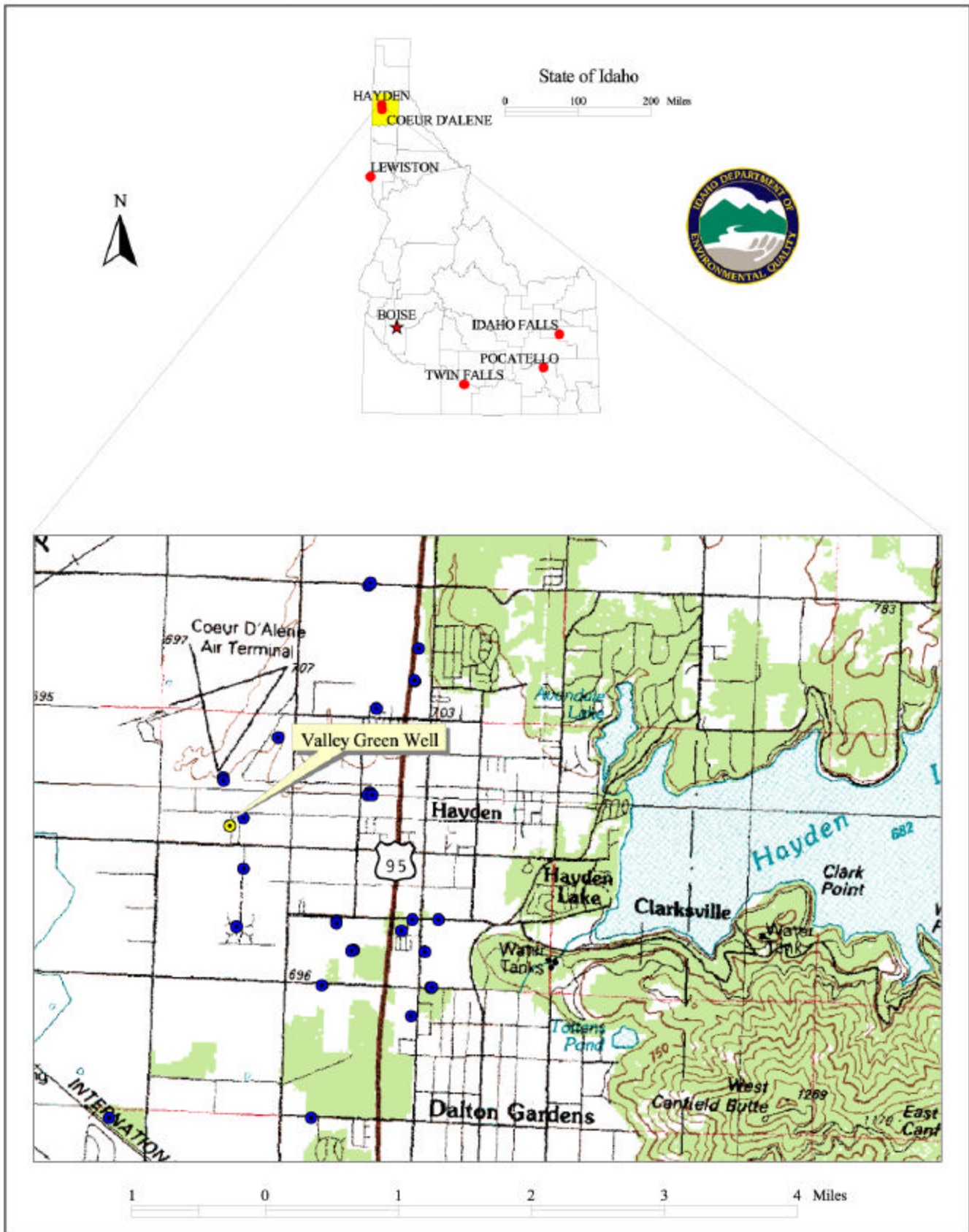
The following sections contain information necessary for understanding how and why this assessment was conducted. **It is important to review this information to understand what the ranking of this source means.** A map showing the delineated source water assessment area and an inventory of significant potential sources of contamination identified within that area are included. The ground water susceptibility analysis worksheets used to develop this assessment are attached.

Level of Accuracy and Purpose of the Assessment

The Idaho Department of Environmental Quality (DEQ) is required by the U.S. Environmental Protection Agency (EPA) to assess every public drinking water source in Idaho for its relative susceptibility to contaminants regulated by the Safe Drinking Water Act. These assessments are based on a land use inventory inside the delineated recharge zones, sensitivity factors associated with how the well is constructed, and aquifer characteristics. The state must complete more than 2900 assessments by May of 2003. Because resources and the time available to accomplish assessments are limited, an in-depth, site-specific investigation for every public water system is not possible.

The results of the source water assessment should not be used as an absolute measure of risk and they should not be used to undermine public confidence in the water system. The ultimate goal of this assessment is to provide data to local communities for developing a protection strategy for their drinking water supply. The Idaho Department of Environmental Quality recognizes that pollution prevention activities generally require less time and money to implement than treating a public water supply system once it has been contaminated. DEQ encourages communities to balance resource protection with economic growth and development. The decision as to the amount and types of information necessary to develop a source water protection program should be determined by the local community based on its own needs and limitations. Wellhead or source water protection is one facet of a comprehensive growth plan, and it can complement ongoing local planning efforts.

Figure 1. Geographic Location of Valley Green



Section 2. Preparing for the Assessment

Defining the Zones of Contribution - Delineation

The delineation process establishes the physical area around a well that will become the focal point of the assessment. The process includes mapping the boundaries of the well recharge area into time of travel zones (zones indicating the number of years necessary for a particle of water to reach a well) for water in the aquifer. DEQ used a refined computer model approved by the EPA to determine the time of travel (TOT) for water pumped from the Rathdrum Prairie Aquifer. The computer model used data assimilated by DEQ from a variety of sources including the well log for Valley Green Well #1.

Valley Green is a community water system serving approximately 180 people in a residential neighborhood on the west side of Hayden Lake, Idaho (Figure 1). A 390-foot deep well located between Valley and Meadow Ways supplies public drinking water for Valley Green customers. Tennis courts occupy the northern half of the 150 by 175-foot well lot. The remainder of the lot is an open grassy area with scattered trees.

The delineated source water assessment area for Valley Green is a narrow corridor about 2.8 miles long stretching eastward from the well. The delineation is divided into three time of travel zones: 0-to-3, years; 3-to-6 years and 6-to-10 years (Figure 2).

Identifying Potential Sources of Contamination

The goal of the inventory process is to locate and describe those facilities, land uses, and environmental conditions that are potential sources of ground water contamination. Inventories for all public water systems in Idaho were conducted in two-phases. The first phase involved identifying and documenting potential contaminant sources within a system's source water assessment area through the use of computer databases and Geographic Information System maps developed by DEQ. A map showing the delineations and a table summarizing the results of the database search were then sent to system operators for review and correction during the second or enhanced phase of the inventory process. Richard Fairhurst of North Kootenai Water District assisted with this part of the inventory.

Figure 2, *Valley Green Delineation and Potential Contaminant Inventory* on page 7 of this report shows the location of the Valley Green well, the zones of contribution DEQ delineated for it, and potential contaminant sites in the vicinity. Land use in the 0-to-3 year time of travel zone is an urban and agricultural mixture. The delineation boundaries encompass a commercial area near the intersections of Hayden Avenue with Highway 95 and Government Way. Further east, the land use is primarily residential. Homes in the Hayden Lake area are either on a municipal sewage system or have residential septic systems. Table 2 on page 8 of this report summarizes information about the numbered potential contaminant sites inside the delineated area on the map.

Many potential sources of contamination are regulated at the federal level, state level, or both to reduce the risk of release. When a business, facility, or property is identified as a potential contaminant source, this should not be interpreted to mean that this business, facility, or property is in violation of any local, state, or federal environmental law or regulation. What it does mean is that the potential for contamination exists due to the nature of the business, industry, or operation.

Section 3. Susceptibility Analysis

The susceptibility to contamination of all ground water sources in Idaho is being assessed on the following factors:

- physical integrity of the well,
- hydrologic characteristics,
- land use characteristics, and potentially significant contaminant sources
- historic water quality

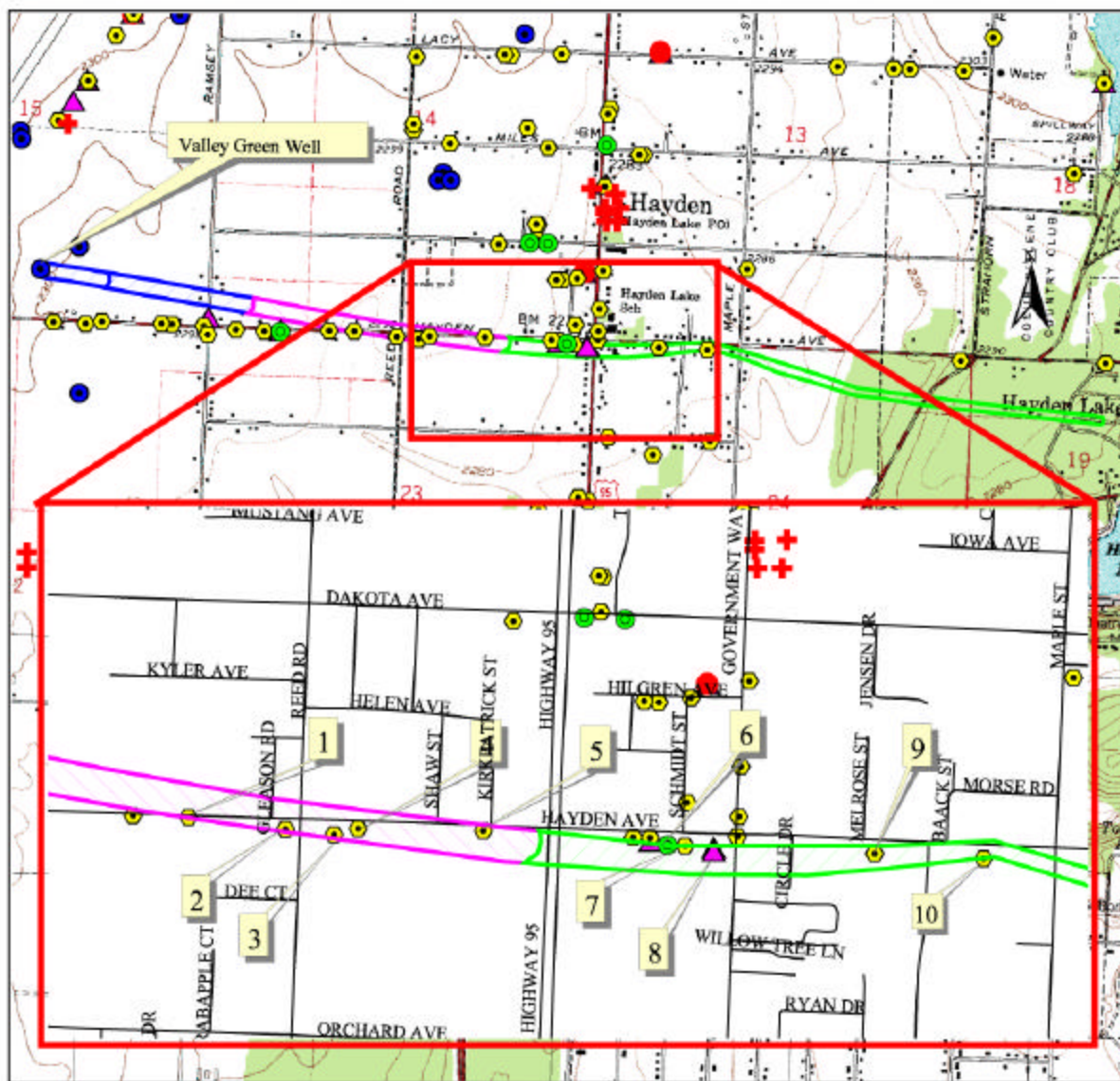
The susceptibility rankings are specific to a particular potential contaminant or category of contaminants. A high susceptibility rating relative to one potential contaminant does not mean that the water system is at the same risk for all other potential contaminants. The relative ranking that is derived for each well is a qualitative, screening-level step that, in many cases, uses generalized assumptions and best professional judgement. The following summaries describe the rationale for the susceptibility ranking. The Susceptibility Analysis Worksheet for the Valley Green well, Attachment A, shows in detail how the well was scored.

Well Construction

Well construction directly affects the ability of the wells to protect the aquifer from contaminants. Lower scores imply a well that can better protect the water. This portion of the susceptibility analysis relies on information from individual well logs and from the most recent sanitary survey of the public water system. The Valley Green well log is on file with DEQ. The Sanitary Survey conducted October 25, 2000 found the Valley Green system to be well run and in compliance with *Idaho Rules for Public Drinking Water Systems*. No deficiencies in the maintenance of the wellhead and surface seal were noted.

Except for a minor difference in the well casing thickness, the Valley Green well appears to meet current Idaho Department of Water Resources construction standards for drinking water wells. The 8-inch diameter steel casing extends from 1.5 feet above the surface to a depth of 390 feet, with a well screen extending from 375 to 390 feet below the surface. The surface seal depth is reported to be 20 feet. Points were marked against the well because the casing and seal both terminate in porous soil strata typical of the Rathdrum Prairie Aquifer. The static water level in the well is 299 feet.

Figure 2. Valley Green Delineation and Potential Contaminant Inventory.



0.5 0 0.5 1 1.5 Miles

Legend

- | | | |
|-----------------------------|-------------------------|-------------------------------|
| ● Wellhead | ● RICRIS Site | ● AST |
| Time of Travel Zones | ● Business Mailing List | ● Recharge Point |
| 0 - 3 Years | ★ Dairy | ● SARA Title III Site (EPCRA) |
| 3 - 6 Years | ● LUST Site | ● Injection Well |
| 6 - 10 Years | ● UST Site | ● Group I Site |
| ● Enhanced Inventory | ● Closed | ● Cyanide Site |
| ● Business Mailing List | ● Open | ● Landfill |
| ● Toxic Release Inventory | ● NPDES Site | ● Wastewater Land App Site |
| ● CERCLIS Site | ● Mine | |



PWS # 1280195
Well #1

Table 1. Selected Construction Characteristics of Valley Green Well

Well	Total Depth (ft.)	Depth of Surface Seal (ft)	Depth of Casing (ft)	Well Screen Depth Range (ft)	Static Water Level (ft)
Well #1	390	20	390	375/390	299

Hydrologic Sensitivity

Hydrologic sensitivity scores reflect natural geologic conditions at the well site and in the recharge zone. Information for this part of the analysis is derived from individual well logs and from the soils drainage classification inside the delineation boundaries. The Valley Green well scored 5 points out of 6 points possible in the hydrologic sensitivity portion of the susceptibility analysis.

Soils in the recharge zone generally are classed as moderately well to well drained. Soils that drain rapidly are deemed less protective of ground water than finer grained, slow draining soils. The depth to first ground water, as reported on the well log, is 300 feet. Sand, gravel, and cobbles predominate in the soil strata between the topsoil and the water table. There is a 10-foot layer of clay immediately above the water table, which provides some protection against the vertical transport of contaminants.

Potential Contaminant Sources and Land Use

Figure 2, *Valley Green Delineation and Potential Contaminant Inventory* on page 7 shows the location of the Valley Green well, and the zones of contribution DEQ delineated for it. Land use in the 0-to-3 year time of travel zone is a mixture of urban and agricultural. The delineation boundaries encompass a commercial area near the intersections of Hayden Avenue with Highway 95 and Government Way. Further east, the land use is primarily residential. Homes in the Hayden Lake area are either on the municipal sewage system or have residential septic systems.

Other than urban and agricultural land use, potential contaminant sources identified through the DEQ database search for the Valley Green recharge area all fall in the 3-to-6 and 6-to-10 year time of travel zones. Additional information about sites numbered on the map is tabulated below.

Table 2. Valley Green Potential Contaminant Inventory

MAP ID NUMBER	SITE DESCRIPTION	SOURCE OF INFORMATION	POTENTIAL CONTAMINANTS ¹
1	Auto Repair	Business Mailing List	IOC, SOC, VOC
2	Furniture Manufacturer	Business Mailing List	SOC, VOC
3	Household & Commercial Storage	Business Mailing List	SOC, VOC
4	General Contractor	Business Mailing List	SOC, VOC
5	Well Drilling & Service	Business Mailing List	SOC, VOC
6	Dry Cleaner	RICRIS Database	VOC
7	Fire Department	Business Mailing List	SOC, VOC
8	Gas Station	UST Database	SOC, VOC
9	Water Utility	Business Mailing List	IOC, SOC
10	Funeral Home	Business Mailing List	IOC, SOC

¹ IOC = inorganic chemical, VOC = volatile organic chemical, SOC = synthetic organic chemical

Historic Water Quality

Valley Green chlorinates its water to control bacteria entering the system through the reservoir and distribution lines. The system tests monthly for total coliform bacteria. The system has been granted waivers to reduce the amount of testing required for synthetic organic compounds and volatile organic compounds which have never been detected in the well. Radiological contaminants in concentrations far below MCL have been present since testing began in 1985.

Nitrate concentrations ranging between 0.495 and 2.02 mg mg/l was detected in annual samples collected between 1984 and 1999. The Maximum Contaminant Level (MCL) for nitrate is 10 mg/l. Arsenic (MCL =0.05mg/l) was detected at a concentration of 0.001 mg/l in 1995. It was not present in a sample tested for inorganic chemicals in 1998.

Final Susceptibility Ranking

The Valley Green well ranked moderately susceptible to all classes of regulated contaminants, mostly because of natural geologic conditions associated with the Rathdrum Prairie Aquifer. Cumulative scores for agricultural and urban land use in the recharge zone and potential contaminant sites identified through a database search in the 3-to-6 and 6-to-10 year time of travel zones for the well are shown on Table 3 along with the totals for system construction and hydrologic sensitivity.

The final scores for the susceptibility analysis were determined using the following formulas:

- 1) VOC/SOC/IOC Final Score = Hydrologic Sensitivity + System Construction + (Potential Contaminant/Land Use x 0.2)
- 2) Microbial Final Score = Hydrologic Sensitivity + System Construction + (Potential Contaminant/Land Use x 0.35)

The final ranking categories are as follows:

- 0 - 5 Low Susceptibility
- 6 - 12 Moderate Susceptibility
- > 13 High Susceptibility

The complete susceptibility analysis worksheet for the Valley Green well can be found in Attachment A.

Table 3. Summary of City of Valley Green Susceptibility Evaluation

Cumulative Susceptibility Scores						
Well Name	System Construction	Hydrologic Sensitivity	Contaminant Inventory			
			IOC	VOC	SOC	Microbial
Well #1	3	5	8	9	9	4
Final Susceptibility Ranking						
	IOC	VOC	SOC	Microbial		
Well #1	Moderate	Moderate	Moderate	Moderate		

IOC = inorganic chemical, VOC = volatile organic chemical, SOC = synthetic organic chemical

HIGH* - Indicates source automatically scored as high susceptibility due to presence of bacteria or a VOC, SOC or an IOC above the maximum contaminant level in the tested drinking water

Section 4. Options for Source Water Protection

The susceptibility assessment should be used as a basis for determining appropriate new protection measures or re-evaluating existing protection efforts. No matter what the susceptibility ranking a source receives, protection is always important. Whether the source is currently located in a “pristine” area or an area with numerous industrial and/or agricultural land uses that require education and surveillance, the way to ensure good water quality in the future is to act now to protect valuable water supply resources.

An effective source water protection program is tailored to the particular local source water protection area. The State of Idaho and local health districts have instituted enhanced protection of the ground water in the Rathdrum Prairie Aquifer because of its high use and uniquely pristine water quality. The protections are generally aquifer wide and are not aimed at zones of contribution to a specific well or water system. *The Spokane Valley-Rathdrum Prairie Atlas*, sent to water systems on the prairie when they were invited to perform an enhanced contaminant inventory, describes some of the regional protection measures.

The 186 public water systems in Idaho that draw water from the Rathdrum Prairie Aquifer should consider forming a regional group to represent their interests before state, county and municipal governing bodies when regulatory tools like zoning overlays, or enactment of building codes are the most appropriate ground water protection measures. These types of measures could be used to protect the capture zones of a specific system or group of wells that could be put at risk from local land use changes.

The Valley Green water system is well run and in compliance with *Idaho Rules for Public Drinking Water Systems*. Kootenai Water District may want to develop a written maintenance plan for the well lot so keeping herbicides, pesticides, fertilizers and the like at least 50 feet from the well is retains priority over upkeep of the area for recreational use.

Due to the time involved with the movement of ground water, wellhead protection activities should be aimed at long-term management strategies even though these strategies may not yield results in the near term.

Assistance

Public water suppliers and users may call the following IDEQ offices with questions about this assessment and to request assistance with developing and implementing a local protection plan. In addition, draft protection plans may be submitted to the IDEQ office for preliminary review and comments.

Coeur d'Alene Regional DEQ Office (208) 769-1422

State IDEQ Office (208) 373-0502

Website: <http://www.deq.state.id.us/>

Water suppliers serving fewer than 10,000 persons may contact Melinda Harper, Idaho Rural Water Association, at (208) 343-7001 for assistance with drinking water (formerly wellhead protection) strategies.

References Cited

Great Lakes-Upper Mississippi River Board of State and Provincial Public Health and Environmental Managers, 1997. "Recommended Standards for Water Works."

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Natural Resource Conservation Service, 1991. Idaho Snake-Payette Rivers Hydrologic Unit Plan of Work. March 1991.

United States Geological Survey, 1986. Quality of Ground Water in the Payette River Basin, Idaho. United States Geological Survey. Water Resources Investigation Report 86-4013.

University of Idaho. 1986. Ground Water Resources in a Portion of Payette County, Idaho. Idaho Water Resources Research Institute. University of Idaho. Moscow, Idaho. April 1986.

Attachment A

Valley Green
Susceptibility Analysis
Worksheet

Ground Water SusceptibilityPublic Water System Name : **VALLEY GREEN**Source: **WELL 1**Public Water System Number : **1280195**

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1. System Construction		SCORE			
Drill Date	1/10/77				
Driller Log Available	YES				
Sanitary Survey (if yes, indicate date of last survey)	YES 2000				
Well meets IDWR construction standards	YES	0			
Wellhead and surface seal maintained	YES	0			
Casing and annular seal extend to low permeability unit	NO	2			
Highest production 100 feet below static water level	NO	1			
Well located outside the 100 year flood plain	YES	0			
Total System Construction Score		3			
2. Hydrologic Sensitivity					
Soils are poorly to moderately drained	NO	2			
Vadose zone composed of gravel, fractured rock or unknown	YES	1			
Depth to first water > 300 feet	YES	0			
Aquitard present with > 50 feet cumulative thickness	NO	2			
Total Hydrologic Score		5			
		IOC	VOC	SOC	Microbial
3. Potential Contaminant / Land Use - ZONE 1A (Sanitary Setback)		Score	Score	Score	Score
Land Use Zone 1A	URBAN/COMMERCIAL	2	2	2	2
Farm chemical use high	NO	0	0	0	
IOC, VOC, SOC, or Microbial sources in Zone 1A	NO	NO	NO	NO	NO
Total Potential Contaminant Source/Land Use Score - Zone 1A		2	2	2	2
Potential Contaminant / Land Use - ZONE 1B (3 YR. TOT)					
Contaminant sources present (Number of Sources)	NO	0	0	0	0
(Score = # Sources X 2) 8 Points Maximum		0	0	0	0
Sources of Class II or III leacheable contaminants or Microbials	NO	0	0	0	
4 Points Maximum		0	0	0	
Zone 1B contains or intercepts a Group 1 Area	NO	0	0	0	0
Land use Zone 1B	25 to 50% Irrigated Agricultural Land	2	2	2	2
Total Potential Contaminant Source / Land Use Score - Zone 1B		2	2	2	2
Potential Contaminant / Land Use - ZONE II (6 YR. TOT)					
Contaminant Sources Present	YES	2	2	2	
Sources of Class II or III leacheable contaminants or Microbials	YES	1	1	1	
Land Use Zone II	Less than 25% Agricultural Land	0	0	0	
Potential Contaminant Source / Land Use Score - Zone II		3	3	3	0
Potential Contaminant / Land Use - ZONE III (10 YR. TOT)					
Contaminant Source Present	YES	0	1	1	
Sources of Class II or III leacheable contaminants or Microbials	YES	1	1	1	
Is there irrigated agricultural lands that occupy > 50% of Zone	NO	0	0	0	
Total Potential Contaminant Source / Land Use Score - Zone III		1	2	2	0
Cumulative Potential Contaminant / Land Use Score		8	9	9	4
4. Final Susceptibility Source Score		10	10	10	10
5. Final Well Ranking		Moderate	Moderate	Moderate	Moderate

POTENTIAL CONTAMINANT INVENTORY

LIST OF ACRONYMS AND DEFINITIONS

AST (Aboveground Storage Tanks) – Sites with aboveground storage tanks.

Business Mailing List – This list contains potential contaminant sites identified through a yellow pages database search of standard industry codes (SIC).

CERCLIS – This includes sites considered for listing under the **Comprehensive Environmental Response Compensation and Liability Act (CERCLA)**. CERCLA, more commonly known as Superfund, is designed to clean up hazardous waste sites that are on the national priority list (NPL).

Cyanide Site – DEQ permitted and known historical sites/facilities using cyanide.

Dairy – Sites included in the primary contaminant source inventory represent those facilities regulated by Idaho State Department of Agriculture (ISDA) and may range from a few head to several thousand head of milking cows.

Deep Injection Well – Injection wells regulated under the Idaho Department of Water Resources generally for the disposal of stormwater runoff or agricultural field drainage.

Enhanced Inventory – Enhanced inventory locations are potential contaminant source sites added by the water system. These can include new sites not captured during the primary contaminant inventory, or corrected locations for sites not properly located during the primary contaminant inventory. Enhanced inventory sites can also include miscellaneous sites added by the Idaho Department of Environmental Quality (DEQ) during the primary contaminant inventory.

Floodplain – This is a coverage of the 100-year floodplains.

Group 1 Sites – These are sites that show elevated levels of contaminants and are not within the priority one areas.

Inorganic Priority Area – Priority one areas where greater than 25% of the wells/springs show constituents higher than primary standards or other health standards.

Landfill – Areas of open and closed municipal and non-municipal landfills.

LUST (Leaking Underground Storage Tank) – Potential contaminant source sites associated with leaking underground storage tanks as regulated under RCRA.

Mines and Quarries – Mines and quarries permitted through the Idaho Department of Lands.)

Nitrate Priority Area – Area where greater than 25% of wells/springs show nitrate values above 5mg/l.

NPDES (National Pollutant Discharge Elimination System) – Sites with NPDES permits. The Clean Water Act requires that any discharge of a pollutant to waters of the United States from a point source must be authorized by an NPDES permit.

Organic Priority Areas – These are any areas where greater than 25 % of wells/springs show levels greater than 1% of the primary standard or other health standards.

Recharge Point – This includes active, proposed, and possible recharge sites on the Snake River Plain.

RICRIS – Site regulated under **Resource Conservation Recovery Act (RCRA)**. RCRA is commonly associated with the cradle to grave management approach for generation, storage, and disposal of hazardous wastes.

SARA Tier II (Superfund Amendments and Reauthorization Act Tier II Facilities) – These sites store certain types and amounts of hazardous materials and must be identified under the Community Right to Know Act.

Toxic Release Inventory (TRI) – The toxic release inventory list was developed as part of the Emergency Planning and Community Right to Know (Community Right to Know) Act passed in 1986. The Community Right to Know Act requires the reporting of any release of a chemical found on the TRI list.

UST (Underground Storage Tank) – Potential contaminant source sites associated with underground storage tanks regulated as regulated under RCRA.

Wastewater Land Applications Sites – These are areas where the land application of municipal or industrial wastewater is permitted by DEQ.

Wellheads – These are drinking water well locations regulated under the Safe Drinking Water Act. They are not treated as potential contaminant sources.

NOTE: Many of the potential contaminant sources were located using a geocoding program where mailing addresses are used to locate a facility. Field verification of potential contaminant sources is an important element of an enhanced inventory.

Where possible, a list of potential contaminant sites unable to be located with geocoding will be provided to water systems to determine if the potential contaminant sources are located within the source water assessment area.